

Takata airbag ruptures caused by mix of 3 factors, investigators find

Ammonium nitrate, assembly, hot and humid climate cited



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WASHINGTON -- A consortium of 10 automakers investigating the root cause behind exploding airbag inflators made by Takata Corp. has fingered the ammonium nitrate propellant as a key factor in the deadly ruptures -- but not the only one.

According to the group, known as the Independent Testing Coalition, the ammonium nitrate propellant used in about 23.4 million inflators that Takata deemed defective last year was contained in inflator assemblies that failed to protect the chemical from moisture in humid climates. The exposure to humidity and repeated temperature swings over time can cause the ammonium nitrate to combust violently and rupture the inflator when the airbags deploy in a crash, the group concluded.

David Kelly, leader of the ITC and former chief of the National Highway Traffic Safety Administration, said it was the combination of these three factors -- the use of ammonium nitrate, the construction of Takata's inflator assembly and the exposure to heat and humidity -- that made the inflators vulnerable to rupture.

"You can't have the energetic disassembly without all three factors," Kelly told *Automotive News*. "You have to have all three."

Takata and U.S. regulators long have maintained that long-term exposure to hot, muggy climates was a factor in the ruptures involving ammonium nitrate inflators, but the ITC's finding marks the first time a definitive root cause has been established.

The group, formed in early 2015, consists of representatives from Takata customers affected by inflator recalls: Toyota, Honda, Fiat Chrysler, BMW, Ford, General Motors, Mazda, Mitsubishi, Nissan and Subaru.

Orbital ATK, an aerospace and defense contractor with expertise in rocket propulsion systems, conducted the testing for the ITC.

In a statement, Takata said the findings by Orbital and the ITC are consistent with the supplier's own testing and that done by the Fraunhofer Group, a German scientific research organization that has also been investigating the inflator failures.

"We fully cooperated with ITC to support their analysis, and we will continue to work closely with them, NHTSA and our customers to take aggressive actions that advance vehicle safety," a Takata spokesman said in a statement.

NHTSA said it received the ITC findings today and is reviewing them. The investigation spanned roughly a year and involved testing nearly 2,000 inflators retrieved from recalled vehicles.

Unknowns remain

Yet many unknowns remain.

Kelly said the ITC investigated the four designs of Takata inflators used in some 19 million U.S. vehicles that Takata admitted were defective last May. The group didn't test the type of inflators covered by the Takata recall expansions that began last month.

It also hasn't tested ammonium nitrate inflators with a desiccant -- a chemical drying agent -- that Takata has used in later formulations of its propellant.

Kelly declined to say whether ammonium nitrate is fundamentally safe to use in airbag inflators, saying such a determination was outside the scope of this phase of the ITC's investigation.

NHTSA has said it will order the recall of tens of millions more Takata inflators that use ammonium nitrate unless the chemical is proved safe by the end of 2019.

Kelly said the ITC consulted with Takata throughout its investigation, with the embattled supplier providing data and recalled inflators for testing. He said Takata had no influence on the ITC's root-cause determination, which Kelly shared with the supplier in a meeting Monday.

Next phase

Kelly said the group soon will begin the next phase of its investigation, in which it will look at the performance of replacement inflators and the differences between Takata inflators with and without a desiccant.

The inflator defect -- linked to 10 deaths and more than 100 injuries worldwide -- is already the subject of one of the largest and most complex recall actions in U.S. history, with some 25 million U.S. vehicles affected and suppliers straining to produce enough replacement parts, even as new recall actions are announced.

Regulators have acknowledged that many of the replacement inflators going into recalled vehicles may themselves have to be replaced later once investigators know more about the overall safety of ammonium nitrate.